28 23 00
VIDEO SURVEILLANCE

PART 1 – GENERAL

1.1 DESCRIPTION

PROVIDE AND INSTALL ADDITIONAL CAMERAS AND EQUIPMENT, WHICH IS IDENTIFIED AS THE CLOSED CIRCUIT TELEVISION SYSTEM HERE IN AFTER REFERRED TO AS THE CCTV SYSTEM AS SPECIFIED IN THIS SECTION.

1.2 RELATED WORK

A. For general installation guidelines, Section 28 05 00, COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY.
B. For Warranty of Construction, Section 00 72 00, GENERAL CONDITIONS.
C. For General Requirements, Section 01 00 00, GENERAL REQUIREMENTS.

1.3 SUBMITTALS

A. Submit below items in conjunction with Master Specification Sections 01 33 23, SHOP DRAWINGS, PRODUCT DATA and SAMPLES, and Section 02 41 00, DEMOLITION.
B. Provide certificates of compliance with Section 1.3, Quality Assurance.
C. Provide manufacturer security system product cut-sheets. Submit for approval at least 30 days prior to commencement of formal testing, a Security System Operational Test Plan. Include procedures for operational testing of each component and security subsystem, to include performance of an integrated system test.
D. Submit manufacturer’s certification of Underwriters Laboratories, Inc. (UL) listing as specified. Provide all maintenance and operating manuals per the VA General Requirements, Section 01 00 00, GENERAL REQUIREMENTS.

1.4 APPLICABLE PUBLICATIONS

A. The publications listed below (including amendments, addenda, revisions, supplement, and errata) form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
B. American National Standards Institute (ANSI)/Electronic Industries Alliance (EIA):
   330-09 .....Electrical Performance Standards for CCTV Cameras
   375A-76 .....Electrical Performance Standards for CCTV Monitors
C. Institute of Electrical and Electronics Engineers (IEEE):
   C62.41-02 .....IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits

802.3af-08 .....Power over Ethernet Standard

D. Federal Communications Commission (FCC):

(47 CFR 15) Part 15 Limitations on the Use of Wireless Equipment/Systems

E. National Electrical Contractors Association (NECA):

303-2005 .....Installing Closed Circuit Television (CCTV) Systems

F. National Fire Protection Association (NFPA):

70-08 .....Article 780-National Electrical Code

G. Federal Information Processing Standard (FIPS):

140-2-02 .....Security Requirements for Cryptographic Modules

H. Underwriters Laboratories, Inc. (UL):

983-06 .....Standard for Surveillance Camera Units

3044-01 .....Standard for Surveillance Closed Circuit Television Equipment

1.5 WARRANTY OF CONSTRUCTION.

Warrant CCTV System work subject to the Article "Warranty of Construction" of FAR clause 52.246-21.

PART 2 - PRODUCTS

2.01 GENERAL

A. All equipment and materials used shall be standard components, regularly manufactured, regularly utilized in the manufacturer's system.

B. All systems and components shall have been thoroughly tested and proven in actual use.

C. All systems and components shall be provided with the availability of a toll free 24-hour immediate technical assistance for either the dealer/installer at no charge.

D. All systems and components shall be provided with an explicit manufacturer warranty.

2.02 DIGITAL VIDEO RECORDING MANAGEMENT AND NETWORK SOFTWARE – GENERAL

A. The Video Management Software (VMS) shall meet the requirements of business and government surveillance applications. The software shall be unique and power a line of Network Video Recorders, Digital Video Recorders, Encoders/Decoders, IP Cameras and Workstations. The software

shall provide a complete and comprehensive application for the operation and maintenance of a video surveillance system. It shall provide full live digital video and audio surveillance over a standard 100/1000Base-T network by the use of a GUI incorporating video display areas, toolbars, control palettes, and interactive site map displaying system components.

B. The software shall be available in two versions. One version shall provide full functionality except for recording capability. The second version shall have full functionality plus recording capability. Both versions of the software shall be available either as a software package or preloaded in a workstation/NVR.

C. The software shall offer network connectivity to other family components and share all video and control data over the network using standard network protocol. The number of network-connected components shall only be limited by the number of assigned IP addresses. There shall be no licensing fee for any cameras or edge devices manufactured by the VMS provider.

D. The software shall provide an open platform that allows integration with ONVIF-S compliant commercial off-the-shelf (COTS) video and computer hardware, such as: IP cameras, encoders and IP edge devices, including standard resolution and megapixel cameras, from numerous industry-leading manufacturers; licensing fees shall be charged on a per-camera basis and there shall be no license limit based on the number of cameras installed at a site. It shall support Unicast or Multicast according to the edge device capability.

E. The software shall run on a COTS workstation/NVR with a minimum of Intel Core i5 processor,
4 GB of RAM and 5 GB of disk space. The software shall run on the Microsoft® Windows® 7 Professional 32 or 64-bit; Windows 8 Professional 32 or 64-bit and Windows 2003, 2008 or 2012 Server operating systems.

F. The software, without any degradation to video quality, shall simultaneously offer:

1. 16-channel continuous video playback.
2. 16-channel video playback transmission to the network.
3. 16-channel continuous video receiving from the network.
4. Recording of up to 95 cameras on a single NVR, depending on resolution, quality and fps settings.
5. User selectable video archiving of pre-existing recordings.
6. Video export in AVI, MPEG-4 or Xvid and viewable on a standard DVD and media player supporting these formats.
7. Video archives in a verified, secure USB, CD or DVD format.
8. Support for the GUI to display on a widescreen monitor (16:9/16:10).

G. The software shall offer features including the simultaneous display, playback, distribution and archive of multiple channels of video and audio. It shall collect multiple channels of analog video and digitize them for the purpose of display, archive and requested distribution across the network. Cameras, microphones and sensors shall be the primary input devices. Each channel of video and audio data shall have the capability of being displayed, played back, distributed and archived simultaneously across several servers and clients across the network. The software shall allow recording (version dependent) and viewing at different frame rates (fps). Each sensor channel shall support a NO or NC device. A bookmark feature shall be available.

H. A web-based interface shall be provided to access the VMS from any standard web browser enabled device. It shall provide live viewing, playback and PTZ controls. Groups shall be accessible through the web viewer. A Mobile App shall be available for both Apple and Android smart phones and tablets. The mobile application shall be able to view live or recorded video from any device on the system. It shall be able to view concurrent multiple video stream, up to 4 on phones and 9 on tablets. The mobile application shall have full control of PTZ, including presets, and quick and simple playback. Pinch to zoom on live and recorded video shall be available.

I. The software shall allow control of a DVR or NVR using a keypad or serial host connected to the serial port. The keypad or serial host

shall have the ability to start or stop video, play back video, control PTZ movement and start and stop macros.

J. The software shall support playback from the main screen without losing live video viewing in the following formats:
   1. Edge Playback - by using a right mouse-click, the user can playback video from any edge device that supports edge recording directly from the user interface of the edge device.
   2. Quick playback – by using a right mouse-click, the user will be able to select and launch playback for a specific camera in a pre-defined number of seconds before the live image. The playback window will open adjacent to the live one.
   3. Playback from time – shall allow setting the playback to start from a specific date, time and database on the network. This shall allow playing back the same camera several times.

K. The software shall be provided on DVD or USB drive format in a suitable case.

L. An integral Events Management System (EVM) shall enable the Digital Video Recording and Management Network Software to interface with an external control/management system, for example, a License Plate Recognition System, and correlate recorded and live video to events received from the external control system. The EVM shall receive external data over an IP network in various formats, including XML, from the external system. The data shall be stored in a SQL database maintained on a standalone or shared server. The SQL server shall use Microsoft® SQL Server® 2012 Express Edition database software, which is available as a free download from Microsoft as a minimum. The full SQL server version shall run as well.

M. The EVM system shall be easily configurable from within the Digital Video Recording and Management Network Software. Using the internal events settings, a user shall be able to set up the following:
   1. Define where the EVM database shall be located. Options include the local machine or external server.

2. Select whether a display message shall pop up to inform a user when an event has occurred and define the look of the message and how long it displays. An option for no message display shall also be provided.
3. Trigger alarms or the execution of a macro upon an event occurrence. An option shall be provided to trigger both an alarm and a macro.
4. Assign cameras and/or microphones to an event by associating a particular camera, microphone or camera/microphone combination to a condition or set of conditions received from the external control system. The user shall have to option to filter received events by employing "equal to", "not equal to" and "contains" operands.
5. Configure the database by creating information fields, and specifying their display properties, field type (numeric or alpha-numeric) and whether they may be edited or not.
6. Maintain the database by allowing the user to backup, restore or clear the database. The system shall offer to ability to filter by date, the clearing of the database. For example, clear all events older than August 1, 2010.
7. The system shall display a snapshot providing a still photo of the event, time of the event, camera name and other details. For recorded events, the user can specify a time up to 59 seconds for the snapshot to save prior to the event occurring on the video. This shall enable the user to see if there were any significant actions that occurred prior to the event.
8. Create Events Queries that shall search the database and retrieve events as specified in the queries. Events Queries shall have the ability to be saved and run at any time.

N. The VMS shall be support an Access Control System. The Access Control System can map to any camera in the VMS system to view or record them.

O. Users shall have the ability to generate Events History Reports which shall contain all information related to an event. The user shall have the option to display the reports in either a list or thumbnail view. The reports shall contain camera and site names and event dates and times. Selecting an event in either view will enable to user to play back video for the event. Controls shall be provided to specify whether playback

should begin when the event occurred or up to 30 minutes prior to the event occurring. The user shall have to option to add notes about the event to the database and to save a snapshot (jpg) of the event for reference purposes. The system shall also display information regarding edits, if any were made to the video.

P. Video Masking shall be available centrally through the VMS. This shall allow users with the correct authority to unmask video as needed.

Q. A Thumbnail Search feature shall be provided that shall allow a quick visual search of a specified time period. This time interval shall be able to be narrowed as required. Any thumbnail shall be able to be launched as playback or used to export an archive.

R. An Active Directory (AD) shall provide an interface allowing importing of groups and users from another AD server to ViconNet. This saves the need to create and maintain a separate user database in ViconNet sites where an AD system is already set up.

S. Recording Management shall provide the setup of 24/7 recording or boosting recording parameters upon motion. It shall also allow recording on motion only.

2.03 VIDEO MANAGEMENT SOFTWARE – SETUP, CONFIGURATION AND SECURITY

A. The software shall offer a full multi-user authorization login application. This application shall offer levels of authorization based on defined sites and functions. In addition, a full setup utility shall be available for the Administrator to configure authorizations. A user shall be able to log in by default, as an Administrator or Guest. Guest authorization shall be configurable for specific system operations. Authorization rights setup shall be performed using the Site Authorization screen. Group rights shall be available to configure by specific site. Rights shall provide authority to perform all system functions. The software shall offer a full multi-user authorization process as follows:

1. User groups shall be created once globally and shall function in all components connected to the network. Active directories of users and groups on other servers shall be able to be imported.
2. Users shall be created once globally and shall be given rights to particular groups.
3. Groups shall be authorized and given specific access to each unit, permitting "function-specific" profiles. Individual user authorizations within the groups shall allow certain users access to certain cameras.
4. Users created and authorized for each unit shall be able to log in to any recorder and workstation and automatically have their group rights for that machine follow them.
5. There shall be no virtual limit on the number of groups and users that can be authorized in the software on DVRs or NVRs.
6. The number of groups and users authorized on the IP cameras and encoders/decoders will be a minimum of 20 groups and 100 users.
7. The software shall allow for each group to be authorized or denied access, per component, to:
   a. Login.
   b. Logout.
   c. Site List.
   d. Setup.
      1) Network Setup & Site Name
      2) User and Group Management
      3) Site Authorization
      4) Auto Login
      5) Macro Create-Edit
      6) Alarm Setup
      7) Authentication Settings
      8) Camera, Microphone and Device Setup
      9) Pre & Post Alarm
      10) Storage Database Utilities
      11) Auto Record
      12) Exit to OS
      13) RS-232/422/485 Setup
      14) Picture Quality and Resolution Setup
      15) Registration

16) Manual Record and Playback Setup
17) Central Failure Notification
18) Recording Verification
19) Auto/Manual fps Setup
20) Texting and Email
21) Display Settings
22) Remote cameras and alarm names
23) Data storage allocation
24) Low Bandwidth
25) Language Translation Utility (LTU) Setup
26) Map Sets
27) Reset Nucleus
28) Backup and Restore
29) Settings Summary
30) Scheduler for Macros
31) Camera Grouping
32) Vicon and Non-Vicon Open Standard Cameras
33) Non-Vicon Open Standard Camera Format
34) Video Analytics Engine
35) Scheduling, display and alarm notification
36) Remote pre/post alarm recording
37) Backup utility for setup configuration
38) Video Masking
39) Thumbnail Search
40) Recording Management

e. Reports.
1) Device Status
2) Alarm History
3) Recording Status
4) Audit Log
5) RVS Log
6) CFN Log
7) Save Logs

f. Scheduler/Macro.
1) Run Macro
2) Stop Macro
3) Stop all Macro & Scheduler

4) Resume Scheduler
5) Show Macro

g. Shutdown
h. Manual Record
i. Stop
j. Video Quality
k. Change fps
l. Change Low Bandwidth
m. Site Map
n. Groups
o. Picture
p. Audio
q. Controls
r. Matrix
s. Export Image
t. Print
u. PTZ
v. Playback

B. All users created shall be able to log in to any workstation on the system. A user, given appropriate access, shall be able to remotely configure all components connected to the network. The programming shall include the complete operation of the recorders, including but not limited to:

1. Network Settings and Site Name
2. Site Authorization
3. Auto Login
4. Storage Database
5. Registration
6. Macro Editor
7. Schedule for Macros
8. Alarms
9. Manual Record and Quality Buttons on Screen
10. Recording Verification
11. Authentication
12. Map Sets

13. RS232/422/485 Controls

14. LTU

C. The software shall permit viewing of live video from any camera connected to any recorder on the network.

D. The software shall allow for the simultaneous recording of the same camera in two locations over the network (version dependent).

E. The software shall provide the ability to save any event that was tagged as an alarm (video motion detection, video loss or input received from the EVM system) to be saved to a separate database, where it cannot be overwritten. The feature shall be named Video Vault.

F. An Archive Wizard shall be provided that simplifies the process of creating archives directly from the camera and saving video to removable media, such as: USBs, CD, DVDs or solid-state drives. An embedded player shall be packaged with each archived video clip for playback on any machine.

G. The software shall provide an advanced method for creating and executing extensive software commands. This shall be achieved by the use of macros. Macro configuration shall be defined for recorded cameras and microphones, command duration, recording location (version dependent), local viewing, device ID, picture quality, refresh mode, recording rate (fps) (version dependent), related devices (sensors) and alarm activation.

H. Macros shall allow an authorized user to create and schedule software commands that shall include but not be limited to:
1. Sequencing cameras, including multi-screen displays, in a local and remote recorder.
2. Execute remote macros existing on recorders currently connected to the network.
3. Record cameras at different qualities and frame rates from any recorder on the network (version dependent).

4. Send alarm condition to any recorder and workstation on the network. By the use of macros, an authorized user shall be able to program the destination component of the alarm condition.
5. Run applications or batch files, such as: open a word processor, spreadsheet program, calculator, media player or start a batch program to run additional tasks.
6. Run an audio file on alarm; for example, audible instructions.
7. Send an email, text message, start video or any other task that can be initiated by a batch file in response to a Central Failure Notification (CFN) or Recording System Verification (RVS) notification.
8. An authorized user shall be able to program and execute macros remotely without the need to be physically located at the recorder that the macros will be programmed on.
9. The Schedule/Macro button shall allow the running of preconfigured combinations of camera, sensor and PTZ programmed routines.
10. Macro scheduling shall include but is not limited to:
    a. Days of the week when a macro is active.
    b. Start and end time for when a macro is active.
    c. If a macro is to run continuously or not.
    d. A macro shall be able to run every:
        1) 5 min, 10 min, 1/4 hour, 1/2 hour, 3/4 hour, 1 hour, 2 hours, 3 hours, 4 hours, 6 hours, 8 hours, 12 hours.
        2) A macro shall be able to be scheduled to run for 1-256 cycles.

I. The network and sites configuration shall allow:

1. Set up of a System Nucleus and Backup Nucleus. The Backup Nucleus shall maintain an updated backup of all System Nucleus settings for recovery in case of failure. The system shall provide failover and redundancy and be fully operational in the event of a System Nucleus failure. Each device shall have an updated backup table to allow operation should the System Nucleus fail. A Network Settings menu shall provide a comprehensive worksheet for each networked device. When all units have been set up, the resulting connected devices shall define the site.

2. Site Authorization: Workstation shall be set up using remote recorder or workstation GUI. Site name and authorization shall be established by User and Group. Permissions shall be assigned for all system functions. Authorization settings shall be able to be sent to other Workstations and duplicated.
3. Time synchronization of all components on the network.
4. All appropriate networking features including each server IP, Subnet and Gateway.

J. Device configuration shall have the ability to be configured for system recognition and operation. Valid devices shall be:
1. Cameras, fixed or with integrated PTZ
2. Microphones
3. Sensors
4. Relays

K. All devices shall be assigned a unique ID number and title descriptor. PTZ cameras shall be setup for RS-422 protocol and supported with existing manufacturer's drivers where applicable.

L. There shall be a Central Failure Notification (CFN) System used to identify all possible site errors. The CFN shall be accessible from only the Nucleus unit. The log shall be in a time/date order and be manually reviewed for errors.

M. There shall be a Site Map feature. It shall allow the installation and configuration of a custom screen map used to identify and access site-installed components (recorders, cameras, microphones, etc.). The ideal map shall be a jpg image format in the size of 980 x 735 pixels. In addition, text boxes and sub-maps shall be added to maps, further defining the layout. The utility shall also provide full installation, configuration and editing of maps. Maps of smaller sizes shall have the ability to be moved anywhere on the screen.

N. There shall be a Language Translation Utility (LTU). It shall allow a manual translation of the entire GUI into any language that uses

varying alpha-numeric character sets. The utility shall also store files to enable changing from one language to another.

O. The system shall provide alarm notification via e-mail, text messaging, and work station text. Macros shall be created to view/listen and record video and audio, PTZ cameras at preset positions, trigger alarms over the network and send email or text message for alarms or on schedule.

P. Storage Database Utilities shall allow setup and usage of detected hard disks locally. Any networked recorder, workstation or server shall be a candidate to add to the picture database. Once established, any recorder shall use established hard disks for recording data.

Q. Alarm Setup: Recorder alarms shall be established by adding detectors and configuring motion detection on video. The triggering of the recorder's detectors shall be used to send alarms to remote units and generate email or text messages. In addition, detectors shall be able to be edited and deleted.

R. Authentication: The video from the recorder's cameras shall be enabled to verify the authentication of the video and present an authentication symbol on the displayed video for both live and recorded playback.

2.04 VIDEO MANAGEMENT SOFTWARE – USER INTERFACE

A. The software installed in both recorders and workstations shall be similar in:

1. Graphical User Interface, therefore an operator shall need to learn only one interface for both control and programming of the system.
2. Functions, offering the ability to remotely configure most system components from any recorder or workstation.
3. The application shall display a Main Window and Login Window, where all configuration and operation shall be accomplished.
4. The login window shall consist of a User Name and Password field.

The user interface shall serve both operators and system administrators. For the operator, the controls shall be laid out in a familiar VCR type control array, with Playback, Stop, fast forward, still, slow motion, etc. right under the viewing panes. The workspace area shall enable the operator to select the number of panes to display, view system activity, select quality levels and perform many other functions without having to drill down through menus or search for these commonly used functions. The interface shall also react to user interaction. For example, when a PTZ camera is selected, a full set of controls shall be provided, enabling the operator to control the camera and all of its functions. The system administrator shall easily access functions such as scheduling macros and producing reports from the toolbar at the top of the Main Window. The Setup button on the toolbar shall provide access to the System Settings menu. The System Settings menu shall provide access to all of the features of the software.

B. The Main Window shall provide the following:
   1. The Site and Device List depicting all recorders, servers and workstations connected to the network.
   2. Within the Site and Device List, each unit shall be depicted with all connected devices such as:
      a. Cameras connected, differentiating between PTZ and fixed cameras.
      b. Microphones.
   3. A multi-screen display area that allows for screen displays of:
      a. Single Camera
      b. Quad
      c. 3 x 3
      d. 4 x 4
      e. 6-way
      f. Full screen of any of the above selected multi-screens shall allow for the viewing of the particular multi-screen in full screen mode by hiding the graphical user interface.
   4. PTZ controls:
      a. When a Vicon protocol PTZ camera is selected, an operator shall be able to:
         1) Control pan, tilt, zoom, iris and focus.

2) Execute preset positions.
3) Program preset positions.
4) Complete programming of menus embedded in the selected dome.
5) All PTZ programming and control shall be achieved remotely without requiring an operator to be present at the recorder the PTZ camera is connected to.
6) PTZ control shall be performed dynamically onscreen, not requiring an operator to click on arrows to move the PTZ camera.
7) The PTZ control shall be fully variable by dynamically moving the cursor across the video display.

b. Other PTZ protocols shall be supported by the VMS.

5. Access to all available programming menus.
6. On-demand recording of video currently viewed shall allow for the recording of any camera from any recorder connected to the network.

C. The Site and Device List shall provide a physical list of all known network site areas and connected cameras, PTZ cameras and microphones. The cameras, PTZ cameras and microphones shall be represented by graphical symbols. There shall be a Search function for finding devices in the Site List; a Next and Previous button shall be provided. The user shall also have the option of showing the cameras and devices by logical camera grouping instead of the Site List. Components in the Site and Device List shall be selectable and configurable. PTZ controls shall offer:

1. When a PTZ camera is selected, an operator shall be able to:
   a. Control pan, tilt, zoom, iris and focus.
   b. Execute preset positions.
   c. Program preset positions.
   d. Complete programming of menus embedded in the selected dome.
   e. All PTZ programming and control shall be achieved remotely without requiring an operator to be physically located at the recorder the PTZ is connected to.
   f. PTZ control shall be performed on the video screen without the need for an operator to click on any arrows depicting direction of the device to be moved.

g. The PTZ control shall be fully variable and shall permit an operator to obtain higher pan and tilt speeds by simply clicking-and-dragging the mouse cursor on the video screen.

D. Viewing of live cameras shall be performed by:

1. Clicking on the desired camera in the Site and Device List.
2. "Drag-and-Drop" operation of cameras from the Site and Device List to the appropriate multi-screen space.
3. "Drag-and-Drop" operation of the recorder from the Site and Device List to the appropriate multi-screen space.
4. "Drag and Drop" operations from a camera group list to the appropriate multi-screen space.
5. "Drag and Drop" operations from a graphical map to the appropriate multi-screen space.

E. The Navigator Window shall graphically display recorded video. It shall contain all function buttons necessary to access the video on-screen. These functions include but are not limited to:

1. A scalable timeline shall be available to define "from" and "to" time/date intervals of video and audio.
2. Cameras and microphones shall be selected from the Navigator List and displayed in the timeline in different colors for video and audio
3. The display mode shall be selected from a palette to configure the number of cameras played back.
4. An "Export Video" button shall be used to create a video clip in the following formats: AVI, MPEG, Xvid of the selected single camera video segment.
5. A "Museum Search" button shall be available to search selected video segments for "Area of Interest" (AOI) events using a scalable sensitivity setting. A "Thumbnail Search" button shall be available to quickly search all ONVIF recorded video, using 16 thumbnail images spread evenly across a specifiable time range. A single click on thumbnail launches playback. An interface shall be provided to export video.

6. A Play button shall be available to display the Main Window with the Video Display Area containing the selected video segments ready for review.
7. Video retrieval in the Navigator Window shall be performed by:
   a. Selecting the Display Mode for required number of cameras.
   b. Selecting the device (recorder or workstation) where video was previously stored or archived.
   c. Selecting the cameras and microphones to be played back.
   d. By "Drag-and-Drop," similar to the live view, selected cameras and microphones are inserted into the multi-screen displays so that an operator can view a mix of previously recorded cameras and live video on the same screen.
   e. The timeline shall provide a graphical interface depicting color-coded bars that indicate video previously recorded as well as all alarmed video and audio.
   f. Video indicator bar shall indicate recording with no sensed motion
   g. Any recorders on the network shall be capable of playing back, by utilizing the multi-screen displays, a mix of videos previously recorded on any other server on the network, or archived.
   h. The Navigator Window shall offer the ability to playback cameras:
      1) One by one.
      2) Time synchronized (precise timeline when the cameras were recorded).
      3) By double-clicking any alarm report line or alarm window.

F. Access to programming and more advanced screens shall be done by means of an immobile, permanently docked toolbar located on the top live screen. The toolbar shall provide access to the following major functionality of the system:
1. The Scheduler/Macro.
2. Reports.
3. Setup.
4. Logout and Shutdown buttons.

G. The operator shall have the ability to launch web pages or any other type of web-based information such as embedded HTML or PDF documents

from within the user interface. Along with informational websites such as traffic, weather or news reports, internal operating procedures such as operation during emergencies, lockdowns, severe weather, etc. shall be launched and controlled from the VMS system and have passcode protected authorization.

H. Authentication shall be configured using the Authentication Settings screen. Authentication display shall be configured by site and affect the destination video. A check box shall be available to enable video authentication and view the status of the video generated. The video authentication scheme shall utilize a 128-bit MD5 algorithm.

2.05 VIDEO MANAGEMENT SOFTWARE – VIDEO QUALITY

A. The encoders and IP cameras shall employ a compression algorithm based on:

1. Optimized MPEG-4, JPEG (Normal and Full) or H.264. The software running on the DVRs and NVRs shall support the algorithms used by the devices.
2. User selectable levels of resolution (quality) depending on camera not requiring a need to restart the application or the digital video recorder. It shall be selectable using a 4-position bar from the main screen. There shall be 4 levels of resolution (4 CIF, 2 CIF, CIF, and HCIF) with 2 levels of compression comprising 8 quality levels total, which shall be accessible from the Setup menu selections.

B. User selectable resolution shall include capture sizes (camera dependant) of:

1. 360 x 122 pixels, 432 x 146, PAL.
2. 360 x 244 pixels, 432 x 293, PAL.
3. 720 x 244 pixels, 864 x 293, PAL.
4. 720 x 488 pixels, 864 x 586, PAL.
5. 1280 x 720 pixels (0.9 MP)
6. 1280 x 1024 pixels (1.3 MP)
7. 1600 x 1200 pixels (2.0 MP)

8. 1920 x 1080 pixels (2.1 MP)
9. 2048 x 1536 pixels (3.1 MP)
10. 2592 x 1944 pixels (5.0 MP)

2.06 VIDEO MANAGEMENT SOFTWARE – ADD-INS

A. Access Control systems shall be available for integration with digital video recording management and network software. These systems shall meet the requirements of business and government access control systems. The system shall monitor and control facility access as well as video detection, temperature and communications loss monitoring. The system shall provide control and access to users on Local Area Networks (LAN), Wide Area Networks (WAN), wireless networks and the Internet. The system shall provide video viewing playback and PTZ control from the VMS.

B. A License Plate Recognition (LPR) system option shall be available to enable the digital video recording management and network software to integrate with an external license plate recognition system. The external LPR system shall link to the Events Management (EVM) system and video and license plate data captured by the LPR system shall be provided to the EVM system, where the data shall be stored along with the related digital video management system video. Event thumbnail images of the license plates and corresponding video may be called up for viewing and review. Operators shall have the ability to generate “white lists” and “black lists” of plate numbers thereby classifying certain reads to automate events, such as alarms, based upon a vehicle’s status.

2.07 VIRTUAL MATRIX DISPLAY CONTROLLER OPTION

A. A Virtual Matrix Display Controller (VMDC) shall be available for digital video recording management and network software. The VMDC shall provide the following capabilities:
1. Display any analog or IP camera on the network on any monitor on the network.
2. Allow the use of both 4 x 3 and 16 x 9 monitors.

3. Allow control of the system from VMDC PC GUI, PLC or a supported keypad.
4. Supports 4 keypads and up to 6 monitors per workstation.
5. Map capability.

B. A keypad shall be provided to provide the following functions:
1. Control PTZ functions.
2. Control camera switching to monitor.
3. Control quick playback to monitor.

The VMDC shall be available as software ready to be installed on a suitable PC, preinstalled on a rack or tower unit.

2.08 ENCODER OPTIONS

A. Encoders shall be available that convert analog camera inputs into streamed IP video data:
1. A four channel unit shall be available that shall be an H.264 encoder.
2. A single channel unit shall be available that shall be an H.264 encoder.
3. An 8-channel unit shall be available.
4. A 16 channel unit shall be available.

2.09 CLIENT WORKSTATION (HMI)

A. Provide all client work stations in conformance with all performance requirements as herein specified and located where indicated on the contract drawings. The HMI shall be an integrated panel PC (all-in-one) with integral Touch Screen and shall be provided in accordance with the all manufacturers recommendations in order to meet all system performance requirements.

1. The integrated PC\Touch Screen HMI client workstation terminals' shall consist of a standalone slim panel computer with integral 22-inch 300 nits high brightness WSXGA LCD touch screen display with a minimum resolution of 1680 x 1050. The integrated panel PC\Touch Screen terminal shall be manufactured by Broadax Systems, Inc (BSI) approved equal. At

the minimum integrated panel PC\Touch Screen terminal' shall include the following;

a. PC processor: Intel Core Duo/Celeron M processor powered by an Intel GM45+ICH9M core logic chipset with 256 MB sharing graphics memory, (2) x DDR3 SO-DIMM 4 GB of memory and a 2.5" SATA 160GB HDD.

1) Video Processor:

a) On-board 32-bit graphics system type processor.
b) IBM or equivalent emulation modes – SVGA.
c) Capable of High Color (16 bit) with a minimum output resolution of 1680 x 1050 pixels, non-interlaced.
d) 256MB Video RAM, minimum.
e) The Touch Screen 22" LCD display shall utilize the full graphics resolution and color Capabilities of the graphic video co-processor.
f) Run all SVGA compatible software using high definition system fonts in all text modes.

b. Sound system: Sound Blaster Audio PCI 128D
c. Touch Screen: 22 inch, resistive type, 80% Light transmission and Touch life 35 million touches.
d. (1) - 24x CD/DVD-RW Drive
e. (2) - 10/100/1000Mbps Ethernet Ports
f. (2) - RS-232 (COM 2/3) Ports
g. (1) - RS-232/422/485 (COM 1) Port
h. (4) - USB 2.0 ports
i. (1) - VGA Port
j. Audio: (1) mic in\out
k. Power: 12 VDC w\ AC\DC Adaptor
l. Watchdog timer 255 level, 0-255 sec
m. Mounting: Versa Table Stand
n. Keyboard: 104+ keyboard
o. Mouse: MS IntelliMouse w/ mouse pad

Operating System: Microsoft Windows 2007

2.10 FIXED IP CAMERA DOME

A. The indoor/outdoor fixed camera dome shall incorporate a varifocal camera/lens combination. The camera dome shall be available for indoor/outdoor surface mounting. The high-resolution day/night camera shall be available with an integral
3-13 mm manual varifocal fixed iris lens or 2.8-8.5 mm motorized zoom and focus varifocal lens with P-iris. Day/night operation shall be achieved using a built-in IR-cut filter. IR illuminators shall be available; IR distance shall be 50 ft (15 m) with 22 IR LEDs. A clear polycarbonate lower dome that is secured by tamperproof screws shall be included.

B. The camera position shall have a three-direction adjustment, allowing for adjustment of pan, tilt and lens rotation (azimuth/roll), for any angle of view required.

C. The camera dome shall be powered by PoE.

D. The camera dome shall have simultaneous dual streaming video and support H.264 and M-JPEG compression. The camera shall be 2 MP (1080p). The camera dome shall transmit full duplex, bi-directional (two-way) audio that is synchronized with the H.264 video stream.

E. Camera features shall include electronic iris, WDR (1, 2, 3 MP versions only), AGC, BLC, white balance, flip and rotate, and motion detection. WDR models and 5 MP models shall have I/O relay, real-time clock and analog out features.

F. The camera dome shall meet the FCC requirements for a Class A device. It shall include support for the industry-standard ONVIF interface. It shall be IP66-rated (NEMA 4) to withstand rain, dust and vandalism and IK10 rated for impact resistance.

G. The camera dome shall provide a slot for an SD card for local storage.

H. The fixed-position camera dome shall meet or exceed the following design and performance specifications.

2.11 DAY/NIGHT IP CAMERA DOME SPECIFICATIONS

A. Imaging Device:	1/3-inch progressive scan CMOS on WDR models; 1/2.7-inch for non WDR models
B. Max. Resolution:	1 megapixel (720p), 2 megapixel (1080p), 3 megapixel and 5 megapixel models
C. Shutter Speed:	1/20,000 sec
D. Automatic Gain Control:	On/Off selectable
E. Sensitivity:	Color: 1-3 MP: 0.2 lux; B&W: <0.05 lux without IR Color: 5 MP: : 0.3 lux; B&W: <0.05 lux without IR
F. Tilt and Horizontal (lens Adjustment:	3-axis adjustment: pan (360°), tilt (90°) and roll may be rotated on its axis 350°)
G. Lens Adjustment:	Models with manual focus and zoom adjustment, fixed iris; models with motorized zoom and focus and P-iris
H. Focal Length:	3-13 mm fixed varifocal or 2.8-8.5 mm motorized varifocal
I. Horizontal Field of View:	3-13 mm: 32°-93°,WDR: 26°-65°; 2.8-8.5: 1-2 MP: 37°-90°; 3 MP 39°-95°; 5 MP: 39°-99° (FOV changes slightly depending upon camera model)
J. IR Distance:	50 ft (15 m) with 22 IR LEDs; IR range of 800-940 nm

2.12 ELECTRICAL SPECIFICATIONS

A. Input Voltage:	PoE
B. Power Consumption:	PoE: <4 W
C. Connectors:	Power: PoE RJ-45 Video/Data: RJ-45 Audio In/Out, I/O, analog video: Requires special cable; available on WDR and 5 MP models only Slot for SD card
D. Radio Frequency Emission Rating:	FCC Class A; CE

2.13 ENVIRONMENTAL SPECIFICATIONS

A. Operating Temperature: -30° to 122°F (-34° to 50°C)

2.14 PHYSICAL SPECIFICATIONS

A. Construction:	Cast aluminum; aluminum trim ring
	Dome: clear polycarbonate; tamperproof screws
B. Dimensions:	Height: 3.8 in. (96.1 mm),
	Diameter: 6.0 in. (152 mm)
	Dome Diameter: 3.9 in. (100 mm)
C. Weight:	Approximately 2 lb (0.9 kg)

2.15 MECHANICAL SPECIFICATIONS

A. Camera Mount:	Surface mount
B. Adjustments:	3 axis adjustment, pan (360°), tilt (90°) and roll/azimuth (350°)

2.16 NETWORK VIDEO SPECIFICATIONS

A. Communication Platform:	Open platform; compatible with Digital Video Management System
B. Compression:	H.264; MPEG-4; M-JPEG
C. LAN Interface:	10 Base-T/100 Base-TX, Multicast
D. Video Channels	Dual streaming
E. Max. Resolution/Frame Rate:	720p: 1280x720
	1080p: 1920x1080
	3 MP: 2048x1536
	5 MP: 2560x1920
	720p/1080p: 30 fps; 3 MP: 20 fps; 5 MP: 10 fps
F. Web Browser:	Internet Explorer, Firefox, Chrome, Safari, Mozilla, Opera
G. Users:	Live viewing for up to 10 clients

H. Image Settings: Auto exposure; flip horizontal and vertical and rotate
180°; configurable brightness, contrast, saturation, and sharpness; auto white balance, AGC; BLC;
WDR (1,2,3 MP versions); motion detection; AC lighting control (50 or 60 Hz)

I. Supported Protocols: IPV4, IPV6 (available with firmware update) TCP, HTTP, HTTPS, RTSP, RTP, CIFS, SMTP, DHCP, NTP, DNS,
UDP, uPnP, ARP, SNMP, ICMP, Zeroconf, APIPA,
Telnet, multicast

2.17 CERTIFICATIONS

A. CE
B. UL
C. cUL
D. FCC, Class A
E. IP66
F. NEMA4
G. IK10
H. RoHS 2
I. ONVIF
J. PSIA
K. ISO

2.18 WARRANTY

A. 3 years, parts and labor

END OF SECTION